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IS 11877 (1986): Method of evaluation of maximum speed of automotive vehicles [TED 4: Automotive Braking Systems]

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UDC 629·113·072

(First Reprint MAY 1998)

IS : 11877 - 1986

Indian Standard

(Reaffirmed 2002)

METHOD OF EVALUATION OF MAXIMUM SPEED OF AUTOMOTIVE VEHICLE

1. Scope — Gives the method of evaluation of maximum speed of an automotive vehicle, such as truck, bus, car and jeep.

2. Features of Test Track

2.1 The test track shall be roadway, clear, smooth, dry, covered with asphalt, concrete or similar material. The longitudinal slope shall not exceed 1 percent and the lateral slope shall not exceed 3 percent in the straight portion. Also the difference in altitude between any two points on the track shall not exceed one metre.

2.2 The test track shall allow a steady speed to be maintained. It shall be in a straight line or form a closed circuit with at least 2 000 m in length and having a minimum radius of 200 m.

2.3 The measuring stretch of track shall have adequate length on either ends for the purposes of achieving the test speed and stopping the vehicle at the end of the trial.

3. Preparation of Vehicle

3.1 The vehicle shall conform in all its parts, components and systems to the design and/or production series as applicable.

3.2 The vehicle shall be run-in as per the manufacturer's recommended practice.

3.3 The adjustments of fuel system, ignition system; grade, quality and quantity of lubricants for the various moving parts; adjustment of brakes; clutch; idling speed, etc, shall conform to the manufacturer's recommendation.

3.4 Before test the vehicle including all its parts, components and systems shall have reached a stable temperature normal to the vehicle operation.

3.5 All the fuel enrichening devices, other than those required for the normal functioning of the vehicle shall be made inoperative.

3.6 The vehicle shall be loaded to the maximum total weight specified by the manufacturer and load distribution between the axles shall be as per the manufacturer's specification.

3.7 The vehicle shall be fitted with tyres which have not covered more than 10 percent of their expected life. The tyres shall be inflated to the pressure recommended in IS : 10914 (Part 2)-1985 'Specification for pneumatic tyres for automotive vehicles : Part 2 Truck, bus and light truck tyres—diagonal ply' and IS : 10914 (Part 3)-1985 'Specification for pneumatic tyres for automotive vehicles : Part 3 Passenger car tyres—diagonal ply', corresponding the maximum total weight specified by the manufacturer. The tread depth measurement may be used to assess the tyre life.

3.8 During testing all the windows of the cabin shall be closed and overhead ventilating system/hatches where provided shall be lowered except as is required for the fitment of instrumentation.

4. Test Conditions

4.1 *Atmospheric Conditions* — Shall be as under:

a) Atmospheric pressure 86 to 106 kPa,
b) Temperature 288 to 308 K,
c) Relative humidity 45 to 75 percent,
d) Maximum wind speed 3 m/s (in any direction), and
e) Maximum wind speed for gusts 8 m/s.

4.1.1 If the conditions at testing are different from those given in **4.1**, the values shall be corrected to standard conditions.

Automotive Vehicles Sectional Committee, EDC 38; Performance Standards for Road Vehicles Subcommittee, EDC 38 : 21 [Ref : Doc : EDC 38 (4569)]

Adopted 16 October 1986

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4.1.2 *Air density* — When the vehicle is tested the air density as described in **4.1.2.1** shall not differ by more than 7·5 percent from the air density under reference conditions.

4.1.2.1 The air density shall be calculated from the formula:

$$d_T : d_0 \times \frac{H_T}{H_0} \times \frac{T_0}{T_1}$$

where

d_T — Air density at test site conditions,
H_T — Atmospheric pressure at test site expressed in m bar,
T_1 — Atmospheric temperature at the test site expressed in K,
d_0 — Air density at reference condition (0·919 7),
H_0 — Atmospheric pressure at reference condition (1 000 m bar), and
T_0 — Temperature at reference condition 298 K.

4.2 *Other Conditions/Features* — It is recommended that conditions and safety features given in **4.2.1** to **4.2.3** shall be observed during the test.

4.2.1 The head lights, parking lights, and the emergency flasher/lights (where applicable) shall be kept operative during the trial.

4.2.2 The test vehicle shall carry a board prominently placed indicating that the test is in progress.

4.2.3 Fitment and operation of all instruments shall be such as not to hamper the visibility or freedom of the driver to have proper control of the vehicle at all times.

5. Evaluation of Maximum Speed

5.1 The gear ratio which allows the vehicle to attain the maximum speed on level road shall be chosen.

5.2 The vehicle shall be accelerated in the best way to achieve its maximum speed. The vehicle speed shall have stabilised before it enters the measuring stretch of the test track.

5.3 The time required to cross the measuring strip of 200 m in length shall be determined within 0·7 percent of measured time. If the distance travelled and time is monitored simultaneously, and it is not possible to restrict the test to exactly 200 m, the measuring stretch shall be within 195 to 205 m and should be established to the nearest 1 m. Each such run shall be termed as one pass.

5.4 In a similar way to **5.1** to **5.3** the test shall be repeated in the opposite direction on the same stretch of the test track.

5.5 The maximum speed shall be calculated as under :

$$\text{Maximum speed (kmph)} = \frac{\text{The total distance travelled for two passes (one each in either direction) in metres}}{\text{The total time taken in seconds}} \times 3{\cdot}6$$

5.6 The test shall be repeated such that the 2 pairs of readings of the calculated maximum speed does not vary by more than 5 percent from each other. The arithmetic average of these observations shall be rounded off to the nearest second place of decimel.

5.7 The observed maximum speed of the vehicle shall be within ±5 percent of the declared maximum speed.

EXPLANATORY NOTE

The maximum speed of the vehicle is one of the important parameters to judge the performance of the vehicle and, therefore, in order to have a uniform method of evaluation of this parameter this standard has been prepared.

Other Indian Standards for measurement of maximum speed of vehicles are :

1. IS : 10278-1982 'Method of measurement for maximum speed of moped'
2. IS : 10413-1983 'Method of measurement of the maximum speed of scooters and motorcycles'.

In the preparation of this standard assistance has been derived from ISO : 7117-1981 'Road Vehicles — Measurement method for the maximum speed of motorcycles', issued by International Organization for Standardization (ISO).

Reprography Unit, BIS, New Delhi, India